Amend **Section 203 – Excavation and Embankment** to read as follows:

"SECTION 203– EXCAVATION AND EMBANKMENT

203.01 Description. This section describes excavating, hauling, and disposing of surplus excavated material; and placing and compacting specified materials necessary to construct project.

Roadway excavation includes excavating and compacting, or disposing of, all materials of whatever character encountered in the work.

For terminology used in this section, refer to Section 101 – Terms, Abbreviations, and Definitions and ASTM D 653.

203.02 Materials

Granular Material for Embankment 703.24

Embankment material shall include excavated, selected, or imported borrow excavated material, or a combination thereof, conforming to the requirements of Subsection 703.24 – Granular Material for Embankment.

Unless otherwise indicated in the contract documents, the following definitions shall apply to this section:

(A) Excavated Material: All material excavated from project site for roadway construction.

(B) Selected Material: Suitable excavated material for specific use from areas within the highway right-of-way.

(C) Imported Borrow Excavated Material: Accepted materials from designated borrow sources outside right-of-way or excavation limits, shall conform to requirements of Subsection 703.24 – Granular Material for Embankment. Imported borrow material shall be free of roots and other organic matter, garbage, trash, junk, and other deleterious material.

203.03 Construction. Clear and grub in accordance with Section 201 - Clearing and Grubbing, before excavating. Excavate and construct embankment for road, road intersections, and road entrances to a smooth and uniform surface. Excavate so as not to disturb material outside limits of slopes or limits of grading.

(A) Excavation.

(1) General. Obliterate old roadways in accordance with Section 202 - Removal of Structures and Obstructions. Blasting will not be allowed.

When encountering possible archaeological, historical, or burial site findings, comply with requirements of Subsection 107.13(B) - Archaeological, Historical, and Burial Sites.

(2) Excavation near HECO 138kV Underground Lines. A Hawaiian Electric Company (HECO) stand-by inspector must be on-site anytime roadway excavation is within ten feet of the outside face of the Fluidized Thermal Backfill (FTB) enclosure surrounding the 138kV cable pipes.

The Contractor shall take great care when excavating near the FTB enclosure surrounding the 138kV cable pipes to prevent damage to the protective coating on the cable pipes.

The Contractor shall take precautions to prevent roadway excavation into the FTB enclosure.

If roadway excavation reaches the FTB enclosure surrounding the 138kV cable pipes, the Contractor shall inform the Engineer. The Engineer will adjust the limits of roadway excavation, as needed, to prevent any encroachment into the FTB.

The Contractor shall properly support and protect the 138kV cable pipes and FTB duckbank at all times.

If the coating is damaged in any way, the Contractor shall notify the HECO stand-by inspector on-site as soon as possible such that the coating may be repaired before back filling.

If any portion of the FTB is removed during roadway excavation, the Contractor shall replace the FTB per HECO requirements.

(3) Cut Slopes. Round tops and ends of cut slopes in accordance with the contract documents.

Finish soil cut slopes true and straight in accordance with slope lines and grades indicated in the contract documents.

Finish cut slopes that are in rock excavation, in a rough condition, with debris and loose material removed. When completed, the average plane of excavated slopes shall conform to slopes indicated in the contract documents. No points shall vary from planned slopes by more than 6 inches when measured at right angles to slope.

(4) Subexcavation. When excavation to finished grade results in subgrade or slopes of unsuitable material as defined in Subsection 101.03 - Definitions, the Engineer will require the following:

(a) Removing unsuitable material.

(b) Backfilling to finished grade with acceptable material in accordance with Subsection 203.03(C) - Embankment Construction.

Notify the Engineer two weeks prior to start of subexcavation operations. The Engineer will perform necessary cross-sectional measurements before authorizing backfill placement.

When relative compaction of original ground is less than compaction specified in Subsection 203.03(C)(3) - Compaction of Cut Areas and Embankments With Moisture and Density Tests, compact upper 6 inches of exposed original ground in accordance with those subsections.

Unsuitable material shall become property of the Contactor and disposal of unsuitable material shall be at no increase in contract price or contract time.

(B) Excavated Material

(1) Selected Material. Use selected material for the following:

(a) Embankment fill.

(b) Finishing top portion of roadbed.

(c) Constructing roadbed shoulders.

(d) Structure backfill.

(e) Constructing berms.

(f) Erosion control.

(g) Landscaping.

(h) Other purposes in accordance with the contract documents.

Place selected material on roadbed in accordance with Subsection 203.03(C) - Embankment Construction and selected topsoil for erosion control in accordance with Section 209 - Temporary Water Pollution, Dust, and Erosion Control.

Keep selected material in place until it can be hauled and compacted in its final position. If allowed by the contract documents, selected material may be stockpiled at locations accepted by the Engineer, for later placement in final position.

(2) Imported Borrow Excavated Material. Arrange to obtain imported borrow excavated material and pay costs. Submit certified test data demonstrating imported borrow excavated material to be incorporated in the work conforms to the contract documents. Acceptance of test data will be subject to field verification testing by the Engineer. Notify the Engineer 20 working days before opening borrow areas.

Control of imported borrow excavated material will be in accordance with Section 106 - Material Restrictions and Requirements.

Excavate to dimensions and elevations established for borrow pit. Remove borrow excavated material after the Engineer completes staking out and cross sectioning of borrow excavated and in-place sites for measurement and payment purposes. Establish and specify finished borrow areas approximately true to line and grade. Complete finished borrow areas so that no water will collect or stand therein.

Place selected material in fill before placing imported borrow excavated material.

(3) Surplus Selected Material. Unless otherwise indicated in the contract documents, and not over soft ground, use surplus selected material when and in locations accepted by the Engineer to do the following: widen embankments uniformly or flatten slopes; dispose of at Engineer's designated locations. Dispose of surplus selected material below adjacent roadbed grade. Complete embankments before disposing of surplus selected material.

When indicated in the contract documents, the quantity of surplus selected material is approximate only. Replace shortage of material caused by premature disposal of surplus selected material at no increase in contract price or contract time.

Upon completion of disposal operations, grade disposal area to provide level surface. Unused selected material shall become the Contractor's property. Supply topographic map of disposal area.

(4) Highly Sensitive Soil. When soil having high moisture content loses its stability and becomes plastic or muddy, excavate with the least manipulation or churning of soil.

(C) Embankment Construction

(1) General. Strip live, dead, or decayed vegetation, rubbish, debris, and other foreign material from ground surface on which embankment is to be placed. When embankment is required on existing slopes steeper than five horizontal to one vertical, bench those areas as work is brought up in layers. Construct bench of sufficient width to permit operation of placing and compacting equipment. Use suitable excavated or imported borrow material, or combination thereof in embankment construction. Placement of rocks, broken concrete, or other solid materials will not be allowed in embankment areas.

When soft or swampy ground condition is encountered that cannot support weight of trucks or other hauling equipment, lower part of fill may be constructed with a working platform. Construct working platform by either placing successive loads of gravel, cobbles, and boulders in a uniformly distributed layer of thickness not greater than necessary; or by using permeable separator with granular material of adequate thickness to support construction equipment. Construct remainder of embankment in accordance with the contract documents.

For minimum depth of 2 feet from subgrade, place embankment material with maximum size of 3 inches and sand equivalent (SE) of 10 or greater, but not less than SE of soil material upon which it is placed. Except as otherwise indicated in the contract documents, embankment material below 2 feet from subgrade may consist of material with maximum size of 3 inches and SE of less than 10 but not less than SE of existing soil on which embankment is placed. Place embankment material in horizontal layers not exceeding 8 inches in loose thickness. Compact as specified before placing next layer. Manipulate material to ensure uniform density and surface smoothness, as compaction of each layer progresses. Add or remove water to obtain required density.

Finish embankment slopes, as indicated in the contract documents, to within plus or minus 3 inches of lines and grades established and such that slopes contain no unsightly or undue

irregularities. Finish top of embankment surfaces in accordance with Subsection 203.03(D) - Subgrade Preparation. Replace portions that become displaced or damaged prior to acceptance at no increase in contract price or contract time.

(2) Relative Compaction Test. Relative compaction test is a procedure or determining ratio of dry unit weight (density) of in-place soil to maximum dry unit weight of same soil, as determined by the following methods:

(a) Maximum Dry Unit Weight. Test for maximum dry unit weight according to AASHTO T 180, and apply the correction for fraction larger than 3/4 inch. Use Hawaii Test Method HDOT TM 5 for sample preparation of sensitive soils when so designated by the Engineer.

(b) Density of Soil In-Place. Test for soil in-place density in accordance with Hawaii Test Method HDOT TM 1, HDOT TM 2, and HDOT TM 3.

(3) Compaction of Cut Areas and Embankments With Moisture and Density Tests. Prior to shaping and compacting, condition soil to moisture content about 2 percent above optimum moisture content determined in accordance with AASHTO T 180. Moisture condition embankment material and place in layers not to exceed 8 inches in loose thickness, and compact each layer of material as specified, before placement of next lift. Determine maximum density and relative compaction in accordance with Subsection 203.03(C)(2) – Relative Compaction Test.

In-situ soil or embankment material contained in prism within 2 feet below subgrade and within width of traveled way, auxiliary lane, and shoulder on each side shall have relative compaction of 95 percent or more. When in-situ material within 2 feet below subgrade does not conform to specified relative compaction, excavate and recompact material until specified relative compaction is achieved.

Top 6 inches of in-situ material and embankment material below top 2 feet of subgrade, and beyond traveled way, auxiliary lane, and shoulder prism, shall have relative compaction of at least 90 percent. When in-situ material cannot be compacted to 90 percent, provide working platform to allow 90 percent compaction of first lift.

(D) Subgrade Preparation. Prepare subgrade to required density, cross section, and grade.

(1) General. Prepare subgrade after completing and backfilling drainage facilities and structures and compacting earthwork.

Remove rocks or lumps and fill voids with suitable materials. Material used to fill voids shall conform to specified material to be placed on subgrade.

(2) Density Requirement. Compact finish subgrade to relative compaction of 95 percent for depth of 6 inches immediately before placing subsequent material thereon.

(3) Surface Tolerances of Subgrade. Finish subgrade upon which pavement structure is to be placed shall not vary more than 0.04-foot above or below theoretical grade.

203.04 Measurement. The Engineer will measure:

(A) Roadway excavation per cubic yard. The Engineer will compute quantities of roadway excavation by average end area method and centerline distances. Curvature correction will not be applied to quantities within roadway prism, as indicated in the contract documents. In computing excavation quantities from outside the roadway prism, where roadway centerline is used as a base, curvature correction will be applied when centerline radius is 1,000 feet or less.

When roadway excavation quantities by average end area method cannot be computed due to the nature of a particular operation or changed conditions, the Engineer will determine and use computation method that will produce an accurate quantity estimate.

(B) Imported borrow excavated material per cubic yard. The Engineer will compute quantities of imported borrow material incorporated into the work on a volume basis, using average end area method in place at work site.

203.05 Payment. The Engineer will pay for the accepted pay items listed below at the contract price per pay unit, as shown in the proposal schedule. Payment will be full compensation for the work prescribed in this section and the contract documents.

The Engineer will pay for each of the following pay items when included in the proposal schedule:

Pay Item	**Pay Unit**
Roadway Excavation	Cubic Yard

The Engineer will pay for:

(A) 15 percent of the contract bid price upon completion of obliterating old roadways and hauling.

(B) 30 percent of the contract bid price upon completion of preparing subgrade.

(C) 40 percent of the contract bid price upon completion of placing selected material in final position, rounding of slopes, and using water for compaction.

(D) 15 percent of the contract bid price upon completion of disposing of surplus excavation material.

Imported Borrow Excavated Material — Cubic Yard

The Engineer will pay for:

(A) 10 percent of the contract bid price upon completion of staking out and cross sectioning existing condition at borrow excavated and in-place sites and establishing borrow area.

(B) 5 percent of the contract bid price upon completion of providing, replacing, and maintaining temporary and permanent fencing.

(C) 15 percent of the contract bid price upon completion of all necessary storing and processing of borrow material.

(D) 15 percent of the contract bid price upon completion of watering and hauling material to work site.

(E) 20 percent of the contract bid price upon completion of placing, grading, and compacting material in accordance with contract requirements at work site.

(F) 15 percent of the contract bid price upon completion of restoring and regrading borrow area.

(G) 10 percent of the contract bid price upon completion of staking out and cross sectioning final condition at borrow excavated and in-place sites.

(H) 10 percent of the contract bid price upon completion of removing and disposing of excess and unsuitable material from work site.

The Engineer will pay for accepted quantities of subexcavation, as roadway excavation at the contract unit price per cubic yard, when ordered by the Engineer, for work prescribed in Subsection 203.03(A)(4) – Subexcavation. Payment will be full compensation for the work prescribed therein and in the contract documents.

The Engineer will pay for accepted quantities of unlined gutter excavation as roadway excavation at the contract unit price per cubic yard, when gutter is located as follows: between roadbed shoulder and adjacent cut slope. Payment will be full compensation for removing and disposing of excavated material; backfilling and compacting; and for the work prescribed in the contract documents.

The Engineer will not pay for stockpiling selected material, placing selected material in final position, or placing selected material in windrows along tops of roadway slopes for erosion control work, separately and will consider the cost as included in the unit prices for the various excavation contract pay items. The cost is for work prescribed in this section and the contract documents.

The Engineer will not pay for selected material from structure excavation, when used instead of borrow excavation.

The Engineer will not pay for overhaul separately and will consider the cost as included in the unit prices for the various excavation contract pay items. The cost is for work prescribed in this section and the contract documents.

The Engineer will not pay for embankment separately and will consider the cost as included in the unit price for roadway excavation. The cost is for work prescribed in this section and the contract documents."

END OF SECTION 203